

### **REMARKS**

This Amendment is submitted with Request for Continued Examination, in response to the second Advisory Action (Paper No. 20070916) mailed on 18 September 2007, the Advisory Action (Paper No. 20070717) mailed on 25 July 2007, and the final Office action (Paper No. 20070322) mailed on 10 April 2007. Reexamination and reconsideration are respectfully requested.

#### **Listing of The Claims**

Pursuant to 37 CFR §121(c), the claim listing, including the text of the claims, will serve to replace all prior versions of the claims, in the application.

#### **Status of The Claims**

Claims 7 through 11, 13 through 17 and 19 through 24 are pending in this application.

#### **Amendment of The Claims**

Claims 1 through 6, 12 and 18 are cancelled without prejudice or disclaimer of its subject matter. Claims 7, 9 and 13 are amended. Claims 19 through 24 are newly added.

#### **Issues raised by Paper No. 20070322**

##### **I. Drawings**

Paper No. 20070322 required submission of drawings with Figures 6 through 8 labeled as *Prior Art* on grounds that “only that which is old is illustrated.” Applicant has earlier petitioned from this requirement. “Old” is not a proper characteristic of “prior art” under any paragraph of 35 U.S.C. §102. Specifically, the requirement is improper; nothing in 35 U.S.C. §102 declares

“that which is old” is “prior art.” Withdrawal of this requirement is therefore respectfully requested.

## II. Abstract Objection

On page 2, paragraph 4 of Paper No. 20070322, the Examiner stated that:

“The abstract of the disclosure is objected to because Applicant recites that ‘micro-patterns preferably have a cross sectional area of 150  $\mu\text{m}$ ’. Paper No. 20070322 however, states that micrometers is not a proper unit of measure for designating area. Correction is required”.

The Examiner’s thorough examination is highly appreciated. Accordingly, the abstract, is amended to read:

“The micro-patterns preferably have a cross sectional **length** of 150  $\mu\text{m}$ .”

This amendment is in accordance with the priority documents (KR 10-2003-0018745). According to an extremely reputable resource, claim 5 of the priority documents can be translated into:

“The helical implant of in claim 2 or 4, wherein the recesses have a cross sectional length of 150  $\mu\text{m}$ .”

Therefore, no new matter is raised under 35 U.S.C. §132.

In addition, because the micro-patterns are formed consecutively along the flank of the thread, the cross-sectional length in the abstract indicates the “pitch”, that is, the distance between two adjacent recesses (or two adjacent protrusions).

## **II. Claim Rejections - 35 U.S.C. §112**

### **Rejection of Claims 7-18 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement.**

Claims 7-18 are rejected under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement.

Regarding claims 7-18, on page 3, paragraph 5 on Paper No. 20070322, the Examiner stated:

“the claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Applicant has added new limitations to claims 7 and 13 directed to ‘inclined flanks of said thread.’ For the purpose of examination, as best understood based on Applicant’s original specification, Examiner will interpret said ‘flanks’ to be the same as the ‘thread inclines’ of claim 1”.

Respectfully, “flank” is an art recognized term well known to a person of ordinary skill in the art; in point of fact, “flank” is unique in its use in this art, and there is no other. The noun “flank” designates the straight sides that connect the crest which is prominent part of the thread, and the root which is the bottom of the thread, as expressly illustrated by the drawing in “The Basic Thread Terms” (<http://www.boltscience.com/pages/screw3.htm>). As admitted by the Examiner, the “inclined flanks of the threads” is an alternative term to refer to the “thread inclines” in claim 1 as well as in the original specification.

Moreover, the Examiner’s attention is invited to note that “The Basic Thread Terms” (<http://www.boltscience.com/pages/screw3.htm>) was submitted as the Information Disclosure Statement on 4<sup>th</sup> January 2007 and was initialed by the Examiner. In addition, the Examiner

stated in paper No. 20070322 that “the information disclosure statement is being considered by the examiner”<sup>1</sup>.

Paper No. 20070322 erroneously asserts that “the claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Applicant’s written specification, as demonstrated by the written Figures 1 through 4, clearly illustrated “flanks.” Moreover, that “flanks” is an art recognized term as illustrated by Applicant’s original Figures 1 through 4, is demonstrated its use in the drawings and detailed descriptions of such well known references as *Locking Thread Construction* by Horace D. Holmes, U.S. Patent No. 4,076,064 issued on the 28<sup>th</sup> of February 1978, and *Screw With Two Types Of Threads* by Pei-Hua Chen, U.S. Patent No. 7,163,366 on the 16<sup>th</sup> of January 2007. In excess of two hundred and seventy-five other recent U.S. Patent issues demonstrate comparable uses of the term “flank.” Therefore, the evidence of record convincing establishes that inventors had possession of the claimed invention with “inclined flanks of the threads. Applicant notes with appreciation, the Examiner’s accurate reading of the amended claims in conformance with the art recognized nomenclature illustrated by FIGS. 1-4, and respectfully requests the Examiner to withdraw this rejection of claims 7 through 18.

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<sup>1</sup> Paper No. 20070322, page 2, paragraph 2.

### **III. Claim Rejections - 35 U.S.C. §102**

**Rejection of Claims 7-10 and 13-16 under 35 U.S.C. §102(b) as being anticipated by Hansson et al. (U.S. 5,588,838).**

Claims 7-10 and 13-16 are rejected under 35 U.S.C. §102(b) as being anticipated by Hansson et al. (U.S. 5,588,838).

#### **III-1. Comparison between the present invention and the prior art**

FIG. 1 illustrates the top views of the implants disclosed in the pending claims, Dicke '853 and Hansson '838.

As shown in FIG. 1a, the pending claims of the present invention generally relates to a helical implant formed with threads. The inclines of the threads (i.e., the flanks as defined in "Basic Thread Term") are formed with micro-patterns, in such a way that the cross-sections of the thread inclines bear the micro-patterns, in order to assist in increasing the contact area at the fixed portion and enhance the contact force. In other words, the micro-patterns are grooved on the flanks of the threads.

As shown in FIG. 1b, Dicke '853 discloses a thread-cutting screw in which the edge forming the screw tip (i.e., the crests as defined in "Basic Thread Term") is partially undulating. The undulating edge has recesses in the shape of a parabola formed in the area of the valleys of the thread edge on the face of each flight. The recesses are asymmetrical so that the front flank face of the recess in the screw-in direction is steeper than the rear flank face in the screw-in direction, so that unscrewing the screw is more difficult than screw-in the screw.

As shown in FIG. 1c, Hansson '838 discloses a fixture, for use in a dental implant system, of the type having an upper portion with a conically flaring outer surface. The conically flaring outer surface is provided with a circumferentially oriented, defined micro-roughness, preferably in the form of threads or beads.

The primary difference between the present invention and the prior art is that in the present invention, the micro patterns formed on the thread inclines (i.e., flanks) are continuous throughout the entire flanks, while the prior art does not disclose this feature.

FIG. 2a illustrates an example of the cross-sectional outlines of the micro patterns of the present invention. As claimed in the pending claims:

claim 7, "... inclined flanks of said threads bearing **a continuum of** micro-patterns increasing exposed surface area of said implant";

claim 13, "... inclined flanks disformed with **a continuum of** micro-patterns increasing exposed surface area of said implant by extending along said flanks and around said core"; and

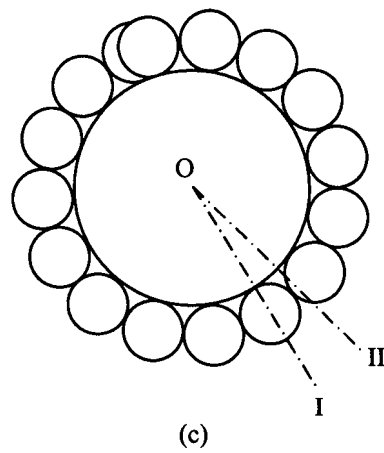
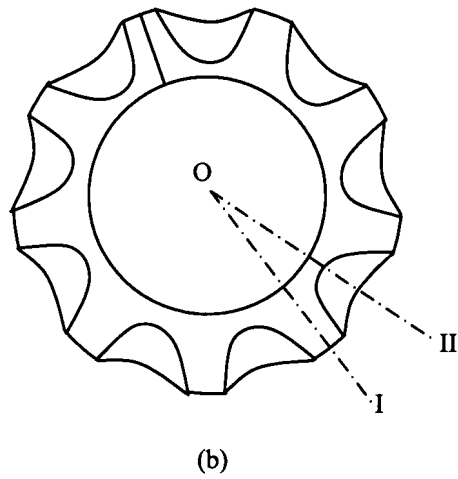
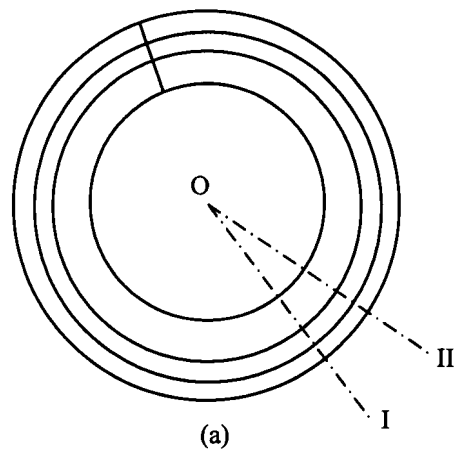


FIG. 1 (a) Top view of the helical implant of the present invention; (b) Top view of the thread-cutting screw of Dicke '853; (c) top view of the dental implant of Hansson '838.

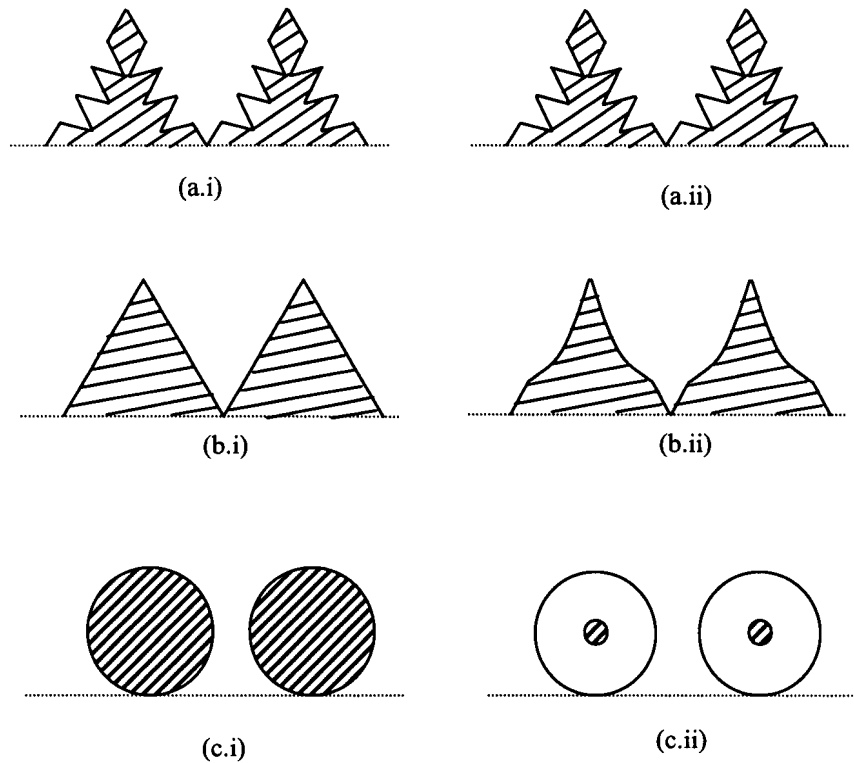


FIG. 2 (a.i) Cross sectional view of the helical implant of the present invention along line O-I in FIG. 1a; (a.ii) cross sectional view of the helical implant of the present invention along line O-II in FIG. 1a; (b.i) cross sectional view of thread-cutting screw of Dicke '853 along line O-I in FIG. 1b; (b.ii) cross sectional view of thread-cutting screw of Dicke '853 along line O-II in FIG. 1b; (c.i) cross sectional view of the dental implant of Hansson '838 along line O-I in FIG. 1c; (c.ii) cross sectional view of the dental implant of Hansson '838 along line O-II in FIG. 1c;.

claim 19, "... at least one micro-pattern formed on the flanks of the screw thread, and extending **helically in a circumferential direction around the cylindrical core**",

the micro-patterns are continuous. Therefore, the cross sections of the micro-patterns are always the same. In this way, the exposed surface of the helical implant can fully contact the bone into



which the helical implant is embedded. Accordingly, the contact area between the helical implant and the bone is increased by these micro-patterns.

To the contrary, Dicke's thread-cutting screw does not have similar cross sections along the entire length of the thread. As shown in FIG. 2b(i), when the cross section is taken along line O-I as shown in FIG. 1b, the cross sectional outline of the thread is straight. On the other hand, as shown in FIG. 2b(ii), when the cross section is taken along line O-II as shown in FIG. 1b, the cross sectional outline of the thread is a straight line connected by a curved line corresponding to the valley of the recess. Obviously, the cutting edge of Dicke's screw is constructed by the outline shown in FIG. 2b(i). Therefore, the valley of the recess could never contact the subject where the screw is embedded. Accordingly, the contact area between the subject and the screw is not increased.

Similarly, Hansson's dental implant does not have similar cross sections along the entire length of the thread. As shown in FIG. 2c(i), when the cross section is taken along line O-I as shown in FIG. 1c, the cross sectional outline of the thread is circular. As shown in FIG. 2c(ii), when the cross section is taken along line O-II as shown in FIG. 1c, the cross sectional outline of the thread is still circular. In this case, the cutting edge of the dental implant is constructed by the outline shown in FIG. 2c(i). Still, the contact area between the dental implant and the bone into which the implant is embedded is not increased.

### **III-2. Claims 7 and 13**

Regarding claims 7 and 13, on page 4, paragraph 8 of Paper No. 20070322, the Examiner stated:

“Hansson discloses a helical implant with a core surrounded by helical threads (i.e. Figure 3), wherein the threads have continuous micro-patterns (i.e. 109) which increase the exposed surface of the implant”.

According to MPEP §2131, in the Office:

“A claim is anticipated only if **each and every element** as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).”

Applicant respectfully submit that Hansson ‘838 fails to teach that the **inclined flanks** of the helical threads are formed with micro-patterns.

**First**, Applicant notes that there are no inclined flanks in any aspect of the embodiment as shown in FIG. 3 of Hansson ‘838 as cited by the Examiner. The circumferentially oriented beads 109 are directly formed on the outer surface of the upper portion 110; in more precise language, circumferentially oriented beads 109 are directly formed on the outer surface of the upper portion 110 of the core. See the cited passage of Hansson ‘838, (column 3, lines 17-21), which states that:

“the conical outer surface of the upper portion 110 of the fixture 101 has circumferentially oriented beads 109. The beads may have a height, spacing, and orientation similar to that of the microthreads 9 described in connection with FIGS. 1-2”.

Therefore, the vertical sectional view of the upper portion 109 would show a plurality of spheres formed on the conically outer surface, as shown in the FIG. 2c(i).

By definition in the art, the “flank” of a thread is the straight side that connects the crest which is prominent part of the thread, and the root which is the bottom of the thread. Comparing

FIG. 2c(i) with the vertical sectional views of the helical implant as shown in FIG. 2a demonstrates that Hansson '838 fails to either teach or suggest that the inclined flanks of the threads having continuous micro-patterns in claims 7 and 13.

**Second**, all of the claims rejected actually define, *inter alia*, a unitary structure with “a core surrounded by helical threads, and inclined flanks of said threads bearing continuous micro-patterns increasing exposed surface area of said implant.” Even assuming *arguendo* that Hansson '838 illustrates “a core surrounded by helical threads”, nowhere does Hansson '838 teach Applicant’s “a core surrounded by helical threads, and inclined flanks of said threads bearing continuous micro-patterns increasing exposed surface area of said implant.” Under the Examiner’s interpretation of Hansson '838, both of the Applicant’s “inclined flanks of said threads bearing continuous micro-patterns” and “inclined flanks of said threads bearing continuous micro-patterns increasing exposed surface area of said implant” are improperly characterized by Paper No. 20070322 as mere surplusage. This is expressly contrary to current Office policy. As was explained by the United States Court of Appeals for the Federal Circuit, language of the Applicant’s claims may not be summarily ignored.<sup>2</sup> All constituent elements of Applicant’s claims 7 through 10 and 13 through 16 must be demonstrated to actually exist in the art as of the time of Applicant’s invention; substitution of the Examiner’s paraphrase of Applicant’s claim language<sup>3</sup> is inadequate under the *the invention* requirement for anticipation

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<sup>2</sup> *Leapfrog Enterprises, Inc. v. Fisher-Price, Inc. and Mattel, Inc.*, No. 06-1402, page 10 (CAFC 9<sup>th</sup> of May 2007).

<sup>3</sup> Pages 3, 4 and 5 of the Examiner’s comments set forth in Paper No. 5 is a paraphrase of Applicant’s claim 1; the Examiner’s proposed combination does not actually use

Page 17 of 23

established by the U.S. Congress in the several paragraphs of 35 U.S.C. §102. Consequently, absent Applicant's structure of "inclined flanks of said threads bearing continuous micro-patterns" and "inclined flanks of said threads bearing continuous micro-patterns increasing exposed surface area of said implant", there is no demonstration of anticipation. Even assuming *arguendo* that the structure of Hannson '838 has some type of "helical threads", the features of that structure are no substitute for Applicant's structure defined by claim 7 and 13. Under 35 U.S.C. §102, these differences<sup>5</sup> illuminate the absence of anticipation. This rejection is therefore inadequate to support a finding of anticipation; its withdrawal is respectfully urged.

**Third**, an element of **common sense** must be attendant to all applications of the art to the "subject matter sought to be patented"<sup>6</sup>; consequently, these differences which were not recognized in the Examiner's comments, serve as convincing indicia of non-obviousness.

### III-3. Claims 8 and 14

Regarding claims 8 and 14, on page 4, paragraph 8 of Paper No. 20070322, the Examiner stated:

"the micro-patterns disclosed by Hansson can either be bead-shaped or thread-shaped (column 2, lines 28-30), both of which have polygonal cross-sections."

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this language. As is noted in this paper, Claim 1 does not teach the relations between claim 1's constituent elements.

<sup>5</sup> As was recently noted by the Court of Appeals, "a *signal* corresponding to a word is not the same as a *signal* corresponding to a letter." *Leapfrog Enterprises, Inc. v. Fisher-Price, Inc. and Mattel, Inc.*, No. 06-1402, page 5 (CAFC 9 May 2007).

<sup>6</sup> *KSR International Co. v. Teleflex Inc.*, 550 U.S. \_\_\_, 2007 WL 1237837, at 12 (30 April 2007). In accord, *Leapfrog Enterprises, Inc. v. Fisher-Price, Inc. and Mattel, Inc.*, No. 06-1402, page 7 (CAFC 9 May 2007).

Applicant respectfully traverses.

Respectfully, the beads or the threads of Hansson '838 are not equivalent to the micro-patterns in the pending claims of the present invention, because the micro-patterns are formed on the flanks of the thread as claimed in claims 7 and 13. According to 37 CFR §1.75 (c),

“Claims in dependent form shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.”

Therefore, claim 8 should incorporate all the limitations in claim 7, where the micro-patterns are formed of the inclined flanks of the threads. Similarly, claim 14 should incorporate all the limitations in claim 13, where the micro-patterns are formed of the inclined flanks of the threads.

To the contrary, in Hansson '838, the beads and the threads, which are asserted by the Examiner to be equivalent to the micro-patterns of the pending claims, are directly formed on the outer surface of the cylindrical body. See the cited passages of Hansson '838:

column 2, lines 24-26, “As can be seen in FIGS. 1 and 2, the outer surface of the conically flaring portion 10 is provided with threads 9 serving as oriented micro-roughness”;

column 3, lines 17-21, “ the conical outer surface of the upper portion 110 of the fixture 101 has circumferentially oriented beads 109”.

Therefore, the threads and the beads of Hansson '838 are formed directly on the outer surface of the body. In other words, there is no micro-pattern on the flanks of the threads. Moreover, there is no polygonal cross-sections on the flanks of the threads.

#### IV. Claim Rejections - 35 U.S.C. §103

**Rejection of Claims 11-12 and 17-18 under 35 U.S.C. §103(a) as being unpatentable over Hansson et al. (U.S. 5,588,838).**

Claims 11-12 and 17-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hansson et al. (U.S. 5,588,838).

Regarding claims 11-12 and 17-18, the Examiner stated:

“Hansson discloses the helical implant as previously described above, but fails to specifically disclose a cross sectional area of  $150\text{ }\mu\text{m}^2$  or that the separation distance between adjacent recesses is  $150\text{ }\mu\text{m}$ . However, it would have been obvious to one having ordinary skill in the art at the time of Applicant’s invention to make the implant with the recesses having such a cross sectional area and separation distance since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art.”

Applicant respectfully traverses.

Respectfully, the Examiner, again, ignores the claim languages that the micro-patterns are formed on the **inclined flanks** of the thread, instead of directly on the cylindrical core. Accordingly, the present invention is not simply “optimizing” value of a variable. Instead, the present invention provides a novel structure where inclined flanks of the threads are constructed with micro-patterns, that is, continuous grooves and ridges.

On the other hand, the prior art provided by the Examiner does not include such a structure. That is, Hansson ‘838 fails to teach or suggest forming micro-patterns on the inclined flanks of the threads or the beads. In addition, nowhere in Hansson ‘838 does Hansson ‘838 teaches or suggests that the micro-patterns on the inclined flanks of the threads having a pitch size on an order of  $150\text{ }\mu\text{m}$ .

## **V. Response to the Examiners “Response to Arguments”**

**V-1.** On page 7, paragraph 11 of Paper No. 20070322, the Examiner stated:

“Examiner further notes that the recesses and protrusions of the Dicke ‘853 reference, as described above, also increase the contact area between the screw and the site of implantation”.

Applicant respectfully traverses.

The Examiner’s attention is invited to note the comparisons between the present invention and the prior art as shown in FIGS. 1 and 2 of this Argument. Regarding Dicke’s thread-cutting screw, as shown in FIGS. 2b(i) and (ii), the cross-sectional outlines of the thread are different for different locations. When the cross section is taken along the valley of the recess (as shown in FIG. 2b(ii)), the cross-sectional outline is formed with a recess, and thus may not contact the site of implantation. Therefore, the contact area between the screw and the site of implantation is not increased in Dicke ‘853.

**V-2.** On page 8, paragraph 15 of Paper No. 20070322, the Examiner stated:

“Lastly, in regard to claims rejected in view of Hansson ‘444m Applicant asserts that there is no teaching or suggestion by Hansson that micro-patterns can be formed in the thread inclines of the micro-thread, formed on the envelope surface of the body. However, as noted by Examiner above and further reiterated herein, Applicant never originally claimed such limitations related to ‘micro-patterns’ or ‘micro-thread’ formations”.

Applicant respectfully traverses.

Respectfully, to the contrary of the Examiner’s assertion, the original claim 1 clearly claims that the recess (i.e., micro-patterns) is formed on the thread inclines. See the original claim 1:

“A helical implant formed with threads thereon, wherein each of the threads has **thread inclines comprising one or more recesses**”.

In addition, in the original specification, the recesses are defined as a micro-pattern. See page 5, lines 12-14 of the original specification:

“Specifically, **the recesses mean the micro-patterns** formed inwardly on the thread inclines, and the protrusions mean the micro-patterns formed outwardly on the thread inclines.”

Therefore, the Examiner’s assertion that “Applicant never originally claimed such limitations related to ‘micro-patterns’ or ‘micro-thread’ formations” is groundless.

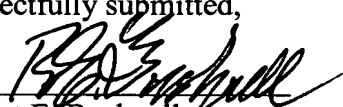
In view of the foregoing amendments and remarks, all claims are deemed to be allowable and this application is believed to be in condition to be passed to issue. If there are any questions, the examiner is asked to contact the applicant’s attorney.

A fee of \$405.00 (Small Entity) is incurred by filing a Request for Continued Examination (RCE), and a fee of \$300.00 (Small Entity) is incurred by filing a petition for three-month extension of time. Please note that two-month extension of time fee of \$225.00 (Small Entity) has been previously paid on 27 August 2007. ( $\$525.00 - \$225.00 = \$300.00$ ) Applicant's check drawn to the order of the Commissioner accompanies this Amendment. Should there be a deficiency in payment, or should other fees be incurred, the Commissioner is authorized to



charge Deposit Account No. 02-4943 of Applicant's undersigned attorney in the amount of such fees.

Respectfully submitted,

  
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